DOCUMENT RESUME

ED 139 815 TM 006 244

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TITLE ACT Versus SAT in Predicting First Semester GPA.
PUB DATE [Apr 77]
NOTE 14p.; Paper presented at the Annual Meeting of the American Educational Research Association (61st, New York, New York, April 4-8, 1977)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *College Entrance Examinations; *College Freshmen; Comparative Analysis; *Comparative Testing; Correlation; Grade Point Average; *Grade Prediction; Higher Education; High School Students; Motivation; Multiple Regression Analysis; *Predictor Variables; Seniors; Statistical Analysis; Test Results
IDENTIFIERS *ACT Assessment; *Scholastic Aptitude Test

ABSTRACT

This study compared the ability of the ACT Assessment Battery (ACT), the Scholastic Aptitude Test (SAT), and six other variables to predict first semester Grade Point Average (GPA) at the University of Illinois at Urbana-Champaign, a "highly selective midwestern university". Additional purposes were to determine: (1) the effect of using the short form SAT instead of the long form SAT in multiple regression equations, and (2) whether a difference exists in the motivation of the same students, taking the SAT in the spring as part of the regularly scheduled national SAT testing program and in the fall as part of a special experimental testing session designed for entering freshmen. This was examined by comparing the correlation of spring and fall SAT scores with a third spring score, School and College Ability Tests (SCAT). The 12 variables used in this study were SAT short form (verbal and quantitative), ACT (English, mathematics, and composite), SCAT (verbal, quantitative, and total), SAT long form (verbal, quantitative, and total) and high school percentile rank (HSPR). Results suggest that, in general, the ACT and SAT are equally able to predict first semester GPA either alone or in multiple prediction with HSPR. HSPR is, by far, the best single predictor of success. Adding more variables to the prediction equation increases the multiple regression only slightly. Finally, the short form SAT appeared to be as good a predictor of first semester GPA as the long form SAT. (Author/MV)

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ACT Versus SAT in Predicting First Semester GPA

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Abstract

Previous research has suggested that although ACT and SAT are equally capable of predicting first semester college grades, ACT seems to predict first semester GPA better at highly selective institutions. The present study found, instead, that SAT was the better predictor at a highly selective midwestern university. In addition, comparisons were made between the long and short form results of the SAT to determine equivalency of the tests as well as to determine equivalency of the results under different testing conditions.

ACT Versus SAT in Predicting First Semester GPA

Introduction

Numerous studies have been conducted comparing the ability of the American College Testing (ACT) Program tests and the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board (CEEB) to predict first semester grade point average (GPA) (Boyce & Paxon, 1965; Burns, 1964; Lenning & Maxey, 1973; Lins, Abel & Hutchins, 1966; Passons, 1967; Zimmerman & Michael, 1967; Chase, Ludlow, Pomeroy & Barritt, Notes 1 & 2; Lenning, Note 3; Munday, Note 4). Most of these studies have concluded that both tests are equally capable of predicting college grades.

Another question raised by some researchers is the ability of the ACT to predict better at the upper end of the score range than the SAT. Lenning (Note 3) investigating whether the ACT was superior to SAT in predicting college grades at a highly selective institution concluded that the ACT will predict grades as well as, and possibly better than, the SAT. This study, however, was limited to a military academy which is a selective university with a very specialized purpose. Research on this question at the more prevalent types of selective institutions is, therefore, needed.

The primary purpose of this study is to compare the ability of the ACT, SAT, and six other variables to predict first semester GPA at the University of Illinois at Urbana-Champaign (UIUC), which is a highly selective midwestern university. Additional purposes were to determine: (a) the effect of using the short form SAT instead of the long form SAT in multiple regression equations, and (b) whether a difference exists in the motivation of the same students taking the SAT in the spring as part of the CEEB regularly scheduled national testing program and in the fall as part of

a special experimental testing session designed for entering freshmen. This will be looked at by comparing the correlations of spring and fall SAT scores with a third spring score, SCAT. The 12 variables used in this study are SAT short form (verbal and quantitative), ACT (English, mathematics, and composite), SCAT (verbal, quantitative, and total), SAT long form (verbal, quantitative, and total) and high school percentile rank (HSPR).

Method

The sample consists of 4283 fall 1973 entering freshmen at the UIUC who received a first semester GPA and who had a measure on at least one of the 12 variables. These students took any combination of the SAT long form, ACT, and SCAT during spring pre-college testing. The entire sample took the SAT short form during the week of registration on the UIUC campus in the Diagnostic Testing session.

The criterion for this study is student GPA at the end of the first semester. Pearson product-moment correlations (r) were computed between each pair of variables. In addition, multiple correlations (R) and stepwise multiple regressions were calculated. All calculations were done using SPSS and SOUPAC data analysis packages.

Results

All variables have correlations with the criterion significantly different from zero at the $p < .001$ level. Correlations are presented in Table 1. The variable with the highest correlation with the criterion is HSPR ($r = .429$). The best set of predictors using stepwise multiple regression is HSPR and SAT-total score ($R = .449$). The addition of other variables does not appear to contribute significantly to the prediction of GPA (see Table 2).

Insert Tables 1 and 2 about here

Multiple Rs for several sets of variables were calculated (Table 3). HSPR, short form SAT-verbal, and short form SAT-quantitative have a multiple R of .442 while HSPR, long form SAT-verbal, and long form SAT-quantitative have a multiple R of .450. There appears to be no practically significant difference between the two sets of variables in their ability to predict GPA. In addition, HSPR, SCAT-verbal, and SCAT-quantitative have a multiple R of .448, similar to the multiple R obtained using subscales of the short form SAT and long form SAT.

Insert Table 3 about here

It can also be seen in Table 3 that HSPR in combination with either long form SAT-total, ACT-composite, or SCAT-total have nearly identical multiple Rs. Further, HSPR in multiple regression with various combinations of these variables produce multiple Rs of similar magnitude.

The short form SAT correlates quite well with the long form SAT ($r = .734$ for verbal and $r = .747$ for quantitative). These are similar to the correlations of short form SAT with the SCAT-verbal and quantitative subscales (see Table 1). Long form SAT-quantitative and ACT-mathematics are correlated approximately the same with SCAT-quantitative, but long form SAT-verbal correlates higher with SCAT-verbal than does ACT-English. This is also true of total test score.

When correlated with GPA, the long form SAT-verbal has an r slightly larger that that of the ACT-English. On the quantitative subscale, ACT and long form

SAT correlates with GPA to a similar extent. SAT-total has a slightly higher correlation with GPA than does ACT-composite. The differences, though, between these correlations are not statistically significant. SCAT correlates with GPA slightly lower on the verbal and quantitative subscales than does SAT or ACT and only slightly higher than ACT using total test score. Again, these differences are not statistically significant.

In Table 3, multiple R values for HSPR, short form SAT-verbal and quantitative subscales, and either SCAT-total, SAT-total, or ACT-composite are approximately equal (.447, .452, and .446, respectively). Also HSPR and short form SAT-verbal and quantitative subscales produce a multiple R of .442 while HSPR and long form SAT-total has a nearly identical multiple R of .449.

Conclusions

Several conclusions can be drawn from these results. ACT does not appear to predict first semester GPA better than SAT for this sample of students. This is contradictory to results found by Lenning and Maxey (1973) and Lenning (Note 3), who found that ACT was a better predictor of success than SAT at a highly selective institution. This discrepancy may be the result of the larger sample used in this study or the differences in the selection system in use at the institutions involved.

High school percentile rank (HSPR), the best single predictor, accounts for approximately 18% of the variance in first semester GPA. The addition of long form SAT-total, the next best predictor in combination with HSPR, produces a prediction equation accounting for a little over 20% of GPA variance. As previously noted, the addition of other variables only increase slightly the proportion of accounted variance (Table 2). HSPR, then, can predict first

semester GPA almost as well as HSPR combined with long form SAT-total. There is a statistically significant ($p < .01$) improvement in prediction with the addition of this variable but the practical difference is almost negligible.

The short form SAT-quantitative and verbal subtests in combination with HSPR are as good a set of predictors as are HSPR and either SAT-total, ACT-composite, SCAT-total, or the long form SAT-verbal and quantitative subtests. The short form SAT subtests, HSPR, and either SCAT-total, SAT-total, or the ACT-composite worked equally well in predicting first semester GPA. Thus, the short form SAT appears to work as well as the long form SAT when used along with HSPR in predictions of this type. It may be economically advantageous in the case of testing time and money to consider using the shorter SAT for predicting success rather than the longer form.

Based on the results of the SAT short form's correlations with the other variables of interest in this study, it appears that the students were no less motivated in taking that form during the experimental testing session than they were during the regularly scheduled national testing session in the spring. This indicates that students can be successfully motivated to take tests that are used for experimental purposes only.

In general, then, ACT and SAT are equally able to predict first semester GPA either alone or in multiple prediction with HSPR. HSPR is, by far, the best single predictor of success. Adding more variables to the prediction equation increases the multiple r only slightly. Finally, the short form SAT appears to be as good a predictor of first semester GPA as the long form SAT.

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Table 1

Correlations, Means, Standard Deviations, and Ns for

the 4283 Fall, 1973 Entering Freshmen at the UIUC

Variable	Mean	Standard Deviation	N	Correlations[a] and Ns[b]												
				1	2	3	4	5	6	7	8	9	10	11	12	13
SAT-VC (Short Form)	531.34	95.80	4350		.390	.520	.345	.606	.721	.360	.653	.734	.388	.656	.269	.21
SAT-QC (Short Form)	561.18	106.56	4350	4350		.284	.669	.572	.329	.734	.644	.356	.747	.651	.269	.16
ACT-English	22.93	3.73	4100	4100	4100		.375	.714	.607	.342	.569	.614	.348	.558	.344	.25
ACT-Math	27.88	4.78	4100	4100	4100	4100		.766	.342	.802	.688	.385	.787	.689	.359	.22
ACT-Composite	25.99	3.44	4100	4100	4100	4100	4100		.665	.679	.807	.716	.679	.814	.385	.26
SCAT-Verbal	30.05	8.97	4287	4287	4287	4042	4042	4042		.379	.830	.821	.384	.702	.293	.24
SCAT-Quantitative	29.63	9.00	4287	4287	4287	4042	4042	4042	4287		.831	.396	.809	.709	.349	.20
SCAT-Total	59.67	14.92	4287	4287	4287	4042	4042	4042	4287	4287		.738	.719	.854	.378	.27
SAT-Verbal (Long Form)	530.65	84.95	1766	1766	1766	1518	1518	1518	1741	1741	1741		.453	.846	.355	.26
SAT-Quantitative (Long Form)	589.72	87.71	1766	1766	1766	1518	1518	1518	1741	1741	1741	1766		.856	.314	.22
SAT-Total (Long Form)	1120.37	147.63	1766	1766	1766	1518	1518	1518	1741	1741	1741	1766	1766		.393	.29
HSPR	85.09	12.81	4347	4347	4347	4097	4097	4097	4284	4284	4284	1766	1766	1766		.42
First Semester GPA	3.79	.75	4283	4283	4283	4038	4038	4038	4222	4222	4222	1750	1750	1750	4280	

All correlations are statistically significant beyond the p = .001 level.

The Ns for each pair of correlated variables are found below the main diagonal in the correlation matrix.

Table 2

Stepwise Multiple Regression Predicting First Semester GPA from Six of the Twelve Variables

Number of Variables Used	R	R^2
HSPR	.429	.1841
HSPR + SAT-TOTAL	.449	.2016
HSPR + SAT-TOTAL + ACT-ENGLISH	.453	.2052
HSPR + SAT-TOTAL + ACT-ENGLISH + SCAT-QUANTITATIVE	.455	.2070
HSPR + SAT-TOTAL + ACT-ENGLISH + SCAT-QUANTITATIVE + SCAT-TOTAL	.456	.2079
HSPR + SAT-TOTAL + ACT-ENGLISH + SCAT-QUANTITATIVE + SCAT-TOTAL + SAT-VERBAL	.459	.2107

Table 3

Multiple Regression Predicting First Semester GPA from Selected Sets of Variables

Selected Set of Variables	R	R^2
SAT-VC + SAT-QC + HSPR	.442	.1954
SAT-TOTAL + HSPR	.449	.2016
SAT-VERBAL + SAT -QUANTITATIVE + HSPR	.450	.2025
ACT-COMPOSITE + HSPR	.443	.1962
SCAT-TOTAL + HSPR	.445	.1980
SCAT-VERBAL + SCAT-QUANTITATIVE + HSPR	.448	.2007
SAT-VC + SAT-QC + SCAT-TOTAL + HSPR	.447	.1998
SAT-VC + SAT-QC + ACT-COMPOSITE + HSPR	.446	.1989
SAT-VC + SAT-QC + SAT-TOTAL + HSPR	.452	.2043